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ABSTRACT

This program for preservice teachers is an outgrowth of a critical need for preparing students to teach environmental subjects in public schools. By using exit criteria, competencies, and behavioral objectives as guides, students help determine their individual academic needs and then plan a self-instructing, self-paced program to meet these needs. Audiovisual-supported modules and project learning experiences in the local community are the principal teaching methods employed. In addition, students participate in a summer Environmental National Encounter Workshop in which they travel from coast to coast as they learn about the total environment. Upon return to campus, students present programs based on their trip experience with community and academic groups and public school students. The main sources of student evaluations are interviews, student presentations, and project reports. Students who are first involved as preservice paraprofessionals later become in-service participants; in this way they continue the learning process after graduation. (Author/JA)

# PART I

## THE SUMMARY STATEMENT

Part I

PROGRAM SUMMARY

The Environmental Education Program for pre-service teachers at Elizabeth City State University is an outgrowth of a critical need for preparing students to teach environmental subjects in public schools. The program is strongly student centered, and utilizes project learning, shared learning, and modules to accomplish competency-based education.

Extensive use is made of audio-visual supported modules in allowing students to self-pace their learning process in relation to their capability and need.

Students embark on a continuing learning experience in three phases: Phase I - self evaluation and self-instruction in terms of discovered needs; Phase II - project learning by an inventory of the local socio-economic and natural environment; and Phase III - an establishment of goals and sharing of knowledge with others.

Whereas Phase I relies heavily upon audio-visual supported modular teaching, Phase II employs individual project learning and sharing of project results at weekly meetings. A fairly complete inventory of the social and natural environments is assured because of the wide ranging interests of students. In Phase III students conduct in-service seminars for public school teachers with students becoming paraprofessional environmentalists. Students also employ multi-media materials and methods in developing their environmental teaching competency.

During the summer following their junior year students engage in an Environmental National Encounter Workshop in which they spend six weeks traveling from coast to coast. They have an opportunity to live with many contrasting physical environments and observe a socio-economic profile of a large part of the nation. Instructional visitations are made to selected industrial, ecological, and social situations.

The individualized nature of the program and the freedom which students have in designing their learning process precludes the use of written tests for an evaluation of progress. The main sources of evaluation are from interviews, student presentations, and project reporting. In addition students must evaluate their own degree of accomplishment of program objectives and competencies and from this, establish further needs.

Students who are first involved as pre-service paraprofessionals, later become in-service participants, and in this way continue the learning process after graduation. In addition to providing students with a continuing knowledge of the total environment after graduation the program stresses the use of a variety of teaching techniques for meeting the needs of the particular learning job to be done.

# PART II

# THE CASE STUDY

# AN ENVIRONMENTAL EDUCATION CONCENTRATION

## Need for A Concentration

The Task Force on Environment and Natural Resources in cooperation with the North Carolina Department of Public Instruction recognizes that teachers should be prepared in the area of environmental education and that a program should be developed to cope with the vacuum which now exists in teacher preparation. The Task Force has suggested guidelines which are useful for developing the program, preparing the materials and teachers, and the evaluation of the program. The following general objectives for environmental education in North Carolina have been set forth by the Task Force. (1)

1. "To obtain a clear understanding that man is in a symbiotic relationship with his environment."
2. "To obtain a broad understanding of the interrelations among ecosystems and natural resources."
3. "To develop an understanding of man's environmental problems and the decision-making skills to cope with them."
4. "To develop attitudes which will foster involvement by youth in combating environmental problems."

The following quotation from a draft publication on environmental education by the Division of Science Education, North Carolina Department of Public Instruction points out the need for a concentration in Environmental Education.(2)

> "In response to public concern and the mandate of the 1969 General Assembly, North Carolina's Department of Public Instruction and the public school system are engaged in planning and initiating a long-range program of environmental education.
>
> Preliminary studies have indicated that preservice education of teachers in several subject areas and at all levels should be a primary effort. An interdisciplinary approach is called for, and it is not probable that a large number of specialists in environmental education can be trained

> and employed in the next few years. In-service education of teachers will be helpful, but if the endeavor to diffuse environmental education throughout the general curriculum is to be most effective, students preparing to become teachers should become familiar with important concepts of environmental education."

Most teachers are severely handicapped by a lack of knowledge relating to environmental education and all of them need to increase their own educational base in the subject before attempting to direct group discussions. It is apparent from what has been said that the state of North Carolina has recognized this educational deficit and has made a commitment to establish the teaching of the environment throughout the educational system.

It is in response to this need that Elizabeth City State University has made a commitment to North Carolina education .

The Elizabeth City State University campus is situated geographically in an ideal area for investigating the biological, chemical, geological and sociological aspects of environmental education. Students will have an excellent opportunity to participate in field trips designed to investigate the natural, industrial, and life style conditions of the outer Coastal Plain. Eastern North Carolina has a variety of natural environments that range from marine, littoral and estuarine, to fresh water streams, and a variety of lakes and swamps. Each of these magna-environments affords the opportunity for investigations at levels of intensity appropriate to the student's capabilities. We are engaged in meeting the challenge of our times and the educational needs of the state by offering a concentration in Environmental Education for students entering the teaching profession. In addition, the program includes

assistance to in-service teachers and a continuing education program for graduates.

## REQUIREMENTS FOR THE CONCENTRATION

The four requirements for the environmental education concentration include Environmental Education - Phase I, Environmental Education - Phase II, Environmental Education - Phase III and a summer field course in Environmental National Encounter.

Environmental Education - Phase I is taken by students the first semester of their junior year. In this course the student first evaluates his own knowledge of the environment utilizing an outline of the subject area and a list of objectives (tables I & II). He thus identifies his personal shortcomings as far as his knowledge of the environment is concerned and is then in a position for self-development. The student uses audio-visual supported independent study modules and surveys the necessary environmental literature in terms of his own individual needs. This eliminates repetitious learning and allows him to proceed at his own pace. The professor acts as a resource person and helps direct the student toward pertinent sources of information and investigation which will best repair the gaps in his knowledge of the subject. All students meet as a group once weekly to share their learning experiences and to benefit from constructive criticisms and ideas. In addition each student meets individually once each week, with the resource professor for consultation and guidance.

The approach is individualized and has many advantages over other teaching styles. For example, a student with special training

and interests in biology evaluates himself and brings about his self-improvement in a different manner than a student with special interests and background in social science or some other area.

TABLE I

CONDENSED OUTLINE OF ENVIRONMENTAL SCIENCE SUBJECT AREAS

ENVIRONMENTAL EDUCATION - Phase I

I. Introduction
   A. Course outline, procedures, expectations
   B. Overview of the crisis

II. Population
   A. Growth rates
   B. History
   C. Age structure
   D. Distribution
   E. Demographic projections

III. Population Control
   A. How many people can Earth support?
   B. The natural environment of man
   C. Birth control
   D. Family planning

IV. The Limits of the Environment
   A. Heat and energy demands
   B. Non-renewable mineral resources
   C. Water
   D. Food, nutrition, and hunger
   E. Deficiency diseases and malnutrition

V. Sources of Food
   A. Solar energy
   B. Agricultural production
      1. Past
      2. Projected
   C. Pesticides and insecticides
   D. Heavy metal pollution
   E. Radiation dangers
   F. Urban problems
   G. Land utilization
   H. Recreation and leisure time
   I. Aesthetic values

VI. The Crisis Ecosystems
   A. Disruption of food webs
   B. Toxic elements and compounds
   C. Insecticides, soils, and animal mortality
   D. The roles of nitrogen and phosphate
   E. Radiation

VII. Social, Political, and Economic Change
   A. Religion
   B. Education
   C. Law and man
   D. Medicine

Table I - Cont'd.

E. Transportation and communication
F. Economic and political change

VIII. Conclusions
A. Crisis projections
B. Changing attitudes and life styles
C. The doomsday syndrome

TABLE II

Objectives For A Program In
Environmental Education - Phase I:
Self-development

I. Students will develop a knowledge of the following four concepts and their interrelations. These are general concepts which describe goals as well as expected performance.

1. An ecosystem is a system in which biotic and abiotic factors relate and depend on each other through the exchange of materials vital to life.

2. All environmental factors within an ecosystem contribute to and affect the balance of life.

3. Organisms must adapt to a changing environment or perish.

4. The greatest effect on an ecosystem comes from man, and he is capable of preserving or destroying it.

II. In addition to and in keeping with the concepts listed above, students will develop an awareness of the value of conservation of natural resources and the social and economic effects of attitudes and values as they apply to the well-being of man.

III. Students will increase their cognizance of the importance of and need for a quality environment as measured by oral opinion surveys.

IV. Students will develop a knowledge of the interrelationships of scientific, social, economic and political factors in the recognition and analysis of environmental problems as measured by their abilities to design and carry out the investigation of an environmental problem.

V. Within the enormously wide spectrum of Environmental Education the student will focus upon the following specific objectives as those most important for good subject-area performance as proposed above under Roman Numerals I through IV.

A. Be able to design a classroom presentation around the topic of ecology including:

1. Demonstrate graphically the food-chain for a natural habitat.

2. Differentiate orally between producers, consumers, decomposers, interaction groups, and biomes.

3. Conduct a discussion of key species and how they might effect the pyramid of life above them as it extends from a shoreline both seaward and landward.

Table II - Cont'd.

B. List and discuss as appropriate at the students working level the environmental threats to man including, but not limited to, the following:

1. The energy crisis and fossil fuels.
2. Atomic and nuclear sources of energy.
3. Water quality and quantity.
4. Overpopulation, demography, and population structure for D. C.'s and U.D.C.'s.
5. Birth control methods and family planning.
6. Hunger and malnutrition in the U. S. and world.
7. Food sources and food production of the world, including food from the sea.
8. Air pollution sources and air pollutants including the ill effects to man's health.
9. Pesticides, insecticides, and herbicides and the harmful effects they have on the environment.
10. Urban environments and their social problems.
11. Crime and racial injustices.
12. Leisure time and aesthetic values.
13. Noise pollution.
14. Endangered species.
15. World health and the diseases of man.
16. Land use and misuse.
17. Heavy metals in food chains.

C. Be able to explain orally in a classroom presentation the biological magnification of DDT in the food chain and the adverse effects it has on the environment.

D. Contrast the social environments of the developed countries and under-developed countries using the United States and Bangla Desh as examples.

E. On the premise that good health and socio-economic conditions go hand-in-hand, design an investigation to compare the physical environment of homes in Elizabeth City to the health conditions of families living in the homes.

Table II - Cont'd.

F. List the most important non-renewable mineral resources.

   1. Compare present rates of use of iron, copper, aluminum, uranium, silver, and tungsten to the known reserves of these metals.

   2. Present an argument to the class in favor of recycling the natural resources.

   3. Prepare mock legislation to solve the energy crisis.

G. Be able to describe the solid waste disposal problem and how it relates to consumer practices.

H. Maintain a current event file of environmental happenings and be prepared to discuss current environmental issues in class meetings.

I. Develop an environmental science bibliography and film file for use in the continuing education process.

J. Be able to design a nature trail as a multiuse resource for a community and school.

K. Be able to argue that an interdisciplinary and multi-disciplinary approach to environmental problems is the most promising for their solution.

Environmental Education - Phase II is concerned primarily with project learning through a local inventory of the environment in which man is considered in his natural environment, his social environment, and during his leisure time. Students carry out investigations commensurate with their interest and academic background. They learn to use analytical equipment, library resources, government sources, and public information in the analysis of the local environment. They are involved in studying water pollution, air pollution, malnutrition surveys, social problems, recreational facilities, population surveys, natural resources, education attitudes and many other related topics. A list of objectives for Phase II is given in Table III.

As partial fulfillment of the Environmental Education - Phase II course each student designs an environmental investigation in the local area, collects necessary facts, and data, and assemble his knowledge of discovered problems and potential solutions into a report which is submitted to the resource professor and presented to the class for discussion. Not only do students gain the confidence they need after graduation to carry out additional environmental investigations but also the report is of value to local authorities in both the recognition and hopefully the solution of environmental problems. Students have an opportunity to perform their own academic virtuoso and increase their awareness of the relation between man and his life giving environment.

Environmental Education - Phase III consists of the student establishing goals for the future and sharing the knowledge he has

TABLE III

Objectives for Phase II:
Project Learning

I. Develop the necessary skills and knowledge and prepare a teaching module on the environment. Utilize movie and still cameras and audio tapes to give the module audio-visual support. Relate the module to a community situation, condition, or problem within the social, natural, or physical environment.

II. Be prepared to identify environmental problems in the local area. Include but do not limit yourself to the following:

1. Describe three social environmental problems in Elizabeth City, North Carolina in an oral discussion with classmates.

2. Examine a water-polluted site in the Elizabeth City area and write a description of it, including investigative techniques employed in the water analysis.

3. Evaluate land use developments such as the ore at Camden Point Shores by listing the problems they create.

4. Examine the solid waste disposal site and waste water treatment plant in Elizabeth City and present an oral description of their operation.

III. Develop the skills necessary to identify, describe, and evaluate a local environmental problem as measured by a report of research and investigation.

IV. Be prepared to conduct an environmental field trip.

gained with others. In this phase the students go to the public schools and the community and present programs on the environment. In-service teachers from the surrounding area are invited to attend regularly scheduled environmental encounter sessions at which students act as Paraprofessional environmentalists. The students direct discussions among in-service trainees. The professor acts as over-all director and primary resource person with the pre-service student as assistant resource person. Thus, the pre-service student acts in a teaching-learning capacity, and the in-service groups provide input to the discussions and fulfill their need for self-development.

Community programs include lectures on such diverse subjects as family planning, food purchasing, hygiene, slide programs on the physical environment, and films followed by group discussion. In addition, Phase III students become involved in community projects such as beautification, nature trail development, sociometric surveys, development of recreational facilities, clean-up campaigns, and a host of other activities which relate to the community and the public schools. Members of the Department of Education assist in evaluating student presentations.

As one of its primary objectives, Phase III involves students in school and community activities before they graduate. Students are able to move into a teaching situation with considerably more familiarity and expertise than beginning teachers normally have. The student also learns much about the importance of the community in terms of its educational needs and the establishment of lines of communication between the community and public schools.

The program is very flexible and stresses individualized instruction in which, after meeting certain requirements, students may develop their own special interests in the environment.

Rising senior students take a coast to coast environmental study trip as part of a summer Environmental National Encounter Workshop. Evening lectures emphasize the ecography of the regions crossed and supplement visits to pertinent geological, biological, and cultural areas. Among the many experiences designed to give students a wide spectrum National Encounter are visits to mining activities, oil refineries, smelters, the San Diego Zoo to study endangered species and a short trip into Mexico to look at a segment of a foreign environment. From San Diego students travel to Sequoia National Forest and spend a day developing a project in ecography. A number of specialist lecture to students along the trip. Students live with deserts, mountains, plains, and shorelines as they travel across country, and they encounter the good and bad in each of the areas visited.

The course lasts for six weeks allowing one week at Elizabeth City State University for pre-trip orientation and post-trip evaluation. The number of students in the course is limited to twenty. Public school teachers and other university students involved in environmental education may also take this course. Grant funds are available to finance the workshop for the next three years.

After completing the four concentration courses, students are able to carry out the following competencies:

1. Write behavioral objectives for an environmental course which is appropriate for the grade level at which the prospective teacher plans to teach.

2. Devise instructional strategies to achieve each of these objectives and possess the skill to carry them out.

3. Design evaluation techniques other than written tests to determine student achievement.

4. Identify and develop teaching materials, including printed materials, films, filmstrips, and other audio-visual aids, and prepare teaching modules on the environment using these materials.

5. Carry out laboratory work of an investigative nature employing the necessary analytical tools.

6. Organize and conduct an environmental field trip and relate the trips subject matter to the community.

7. Utilize community human and natural resources to teach the environment.

8. Conduct discussions on controversial topics in such a way that each student can participate, regardless of his views or level of understanding.

9. Use games and other activities where appropriate in the learning process.

A sample curriculum for an Intermediate Education Major with a concentration in Environmental Education is given in Table IV.

The program contributes to the improvement of teacher education in several ways:

1. It utilizes new techniques for teaching which are most effective for the teaching job to be done.

2. It prepares pre-service students to teach environmental subject matter.

3. It provides for their continuing education and offers in-service teachers an opportunity to upgrade their knowledge of the environment.

4. It employs evaluation techniques other than standard written tests to determine competency.

5. It offers the student great flexibility so that he can avoid repetitious learning yet have the opportunity to develop his own environmental interest in depth, and it gives him an opportunity to design his own plan for achieving competency.

6. Pre-service students in Environmental Education are heavily involved with community and public school people and activities, resulting in a smoother more knowledgeable transition from student to teacher.

7. The program is activity oriented and highly motivating to students.

## Support and Instructional Staff

The Environmental Education Concentration as part of a College Science Improvement Program Grant is supported by funds from the National Science Foundation for a three year period. Continuing funds will be made available from the State at the end of the grant period. There are funds to support library books and reference materials ($15,000.00), field trips ($1,500.00), the summer National Encounter Workshop ($13,500.00), instructional equipment ($33,000.00), audio-visual materials ($5,000.00), and faculty salaries.

The instructional part of the program is conducted by two persons with assistance from others in the evaluative process.

TABLE IV

CURRICULUM FOR INTERMEDIATE EDUCATION MAJORS (GRADES 4-9)
WITH CONCENTRATION IN ENVIRONMENTAL EDUCATION

FIRST YEAR

| First Semester | | | Second Semester | | |
|---|---|---|---|---|---|
| 20-101 | Language Arts Workshop | 5 | 20-102 | Language Arts Workshop | 3 |
| 31-138 | Phy. Science Survey | 3 | 10-139 | Biological Science Sur. | 3 |
| 32-101 | Mod. Basic Mathematics | 3 | 32-102 | Mod. Basic Mathematics | 3 |
| 41-147 | World Civilization | 3 | 41-148 | World Civilization | 3 |
| 81-101 | Phy. Edu. Orientation | 1 | 80-137 | Health Concepts | 2 |
| | | | 81- | Phy. Edu. Elective | 1 |
| | | 15 | | | 15 |

SECOND YEAR

| | | | | | |
|---|---|---|---|---|---|
| 20-201 | World Literature | 3 | 20-202 | World Literature | 3 |
| 61-212 | General Psychology | 3 | 60-201 | Found. of Education | 3 |
| 70-119 | Art Appreciation | 2 | 70-225 | Arts and Crafts | 3 |
| 71-121 | Intro. to Music Lit. | 2 | Elective: | Social Science | 6 |
| Elective: | Mathematics | 3 | | | |
| 31-385 | Earth Science | 3 | | | |
| | | 16 | | | 15 |

THIRD YEAR

| | | | | | |
|---|---|---|---|---|---|
| 20-319 | Children's Literature | 3 | 61-309 | Educational Psy. | 3 |
| 61-304 | Psy. of Pre-Adoles. & Early Adoles. Dev. | 3 | 80-271 | Health in the Inter. School | 2 |
| 71-314 | Music in the Inter. Sch. | 3 | 81-365 | Phy. Ed. in the Inter. School | |
| | Electives | 4 | | Electives | 6 |
| 34-311 | Environmental Education Phase I | 3 | 34-312 | Environmental Education Phase II | 3 |
| | | 16 | | | 16 |

FOURTH YEAR

| | | | | | |
|---|---|---|---|---|---|
| 60-312 | Methods of Teaching Reading (Early Child. Ed. & Inter. Schs.) | 3 | 60-409 | Phil. of Education | 3 |
| | | | | Electives (may include Philosophy) | 10 |
| 60-410 | Inter. Sch.: Meths., Mats. & Observation | 6 | 34-411 | Environmental Ed. Phase III | 3 |
| 60-438 | Student Teaching | 6 | | | |
| | | 15 | | | 16 |

SUMMER: Environmental National Encounter 34-316 6

Course Descriptions for Catalogue

1. Environmental Education - Phase I. 3 S. H.

Academic inspection and self-development by the student under the guidance of the professor. Survey of environmental information, particularly in terms of the individual students needs. Foundations and basic facts of environmental education.

2. Environmental Education - Phase II. 3 S. H.

Local inventory of the natural and social environment. Investigations and analytical procedures used in problems identification and solution. Report of investigation required.

3. Environmental Education - Phase III. 3 S. H.

Establishing goals and sharing knowledge with the community and public schools. Group analysis of environmental problems. Paraprofessional roles in in-service courses.

4. Environmental National Encounter 6 S. H.

A summer course designed to acquaint students with the wide spectrum of environmental education concerning natural environments, technological problems, natural and man-made pollution, endangered species, life styles, and other related areas. The tour from Elizabeth City to California will include regular evening lectures by the instructor and professional guest lecturers.

# REFERENCES

1. Teacher's Guide for Environmental Education, 1970, prepared by The Task Force on Environment and Natural Resources in cooperation with the North Carolina Department of Public Instruction, 228 pages.

2. Environmental Education - Preservice Preparation of Teachers, Division of Science Education, North Carolina Department of Public Instruction, 25 pages.

# PART III

# THE ABSTRACT

ABSTRACT/INFORMATION FORM - 1974 DAA PROGRAM

(Please note: This information will be the basis for the description of your institution's DAA entry in the official DAA booklet given at the Annual Meeting and subsequently distributed widely.)

Please Type or Print:

Name of Program Submitted: Concentration in Environmental Education

Institution (complete name): Elizabeth City State University

President: Dr. Marion D. Thorpe, Chancellor

Campus Public Information Officer: Mr. John T. Williams

Faculty Member Responsible for Program: Dr. Maurice Powers

Title of the Faculty Member: Professor - Phy. Science & Geography

Signature: _____

Title: _____ Date: _____

Please describe in 150-200 words the program which you have entered in the 1974 AACTE Distinguished Achievement Awards. A sample is included below to give a general idea of the kinds of information we need. Your abstract will be the basis for reporting your entry in Excellence in Teacher Education. Please continue on back if extra space is needed.

SAMPLE: *Hypothetical Sample Description:* Recognizing the necessity for public school teachers to have a continuing education as well as realizing the need for continually updating the elementary science curriculum, the College of Saint Alphonsia Joseph, together with the school district of Stockton, New Hampshire, began in 1969 the Advance Learning for Science Teachers Program (ALSTP). The program, initially funded by a National Science Foundation grant, features a six-week summer institute during which members of the college staff instruct teachers throughout the school district. Also, 30 consultants from the college's science and education departments visit each of the elementary schools during the year. Featured in the six-week institute are effective ways to teach environmental studies, using the neighborhood as key resource. The program has had sufficient impact to project a similar one for secondary science teachers.

Elizabeth City State University has established a program in Environmental Education to prepare pre-service teachers and plan for their continuing education, and to update in-service teachers by utilizing pre-service paraprofessionals to conduct environmental seminars. By using exit criteria, competencies, and behavioral objectives as guides students help determine their individual academic needs and then plan a self-instructing self-paced program to meet these needs. Audio-visual supported modules and project learning experiences in the local community are the principle teaching methods employed. In addition, students participate in a summer Environmental National Encounter Workshop in which they travel from coast to coast as they learn about the total environment. Upon return to the campus, students present programs from their trip experiences to community and academic groups and public school students. The program teaches environmental education to pre-service and in-service groups; it assures the continuing education of graduates; and it establishes important lines of communica-

(Over)

tion between the community, the public schools, and the University.